

A GENERIC REVISION OF THE ONCOMERINAE (HETEROPTERA:  
PENTATOMOIDEA: TESSARATOMIDAE)

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Sinclair, D.P. 2000 12 31: A generic revision of the Oncomerinae (Heteroptera: Pentatomoidea: Tessaratomidae). *Memoirs of the Queensland Museum* 46(1): 307-329. Brisbane. ISSN 0079-8835.

The fifteen accepted genera of the tessaratomid shield bug, subfamily Oncomerinae, are reviewed and a differential key provided. A new diagnosis of the subfamily is established. Generic redescriptions and illustrations of representative species are given for all genera except the newly described *Tibiospina* Sinclair. Distribution records and foodplants are summarised for each genus. All known species are listed. □ *Heteroptera, Tessaratomidae, Oncomerinae, generic key, host plants, genitalia, distribution, Australia.*

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The tessaratomid subfamily Oncomerinae Stål currently includes 15 genera and 57 species (Rolston et al., 1993; Sinclair, 2000) occurring predominantly in the Australian zoogeographic region (sensu Cranston & Nauman, 1991). Major publications on the subfamily subsequent to Stål, some of which include keys to the genera known at that time, include Horvath (1900b), Kirkaldy (1909), Leston (1955a), Leston & Scudder (1957) and Kumar (1969).

All of the 12 oncomerine genera that occur in Australia are confined to the eastern half of the continent, where most are restricted to the narrow, moist, northeastern, coastal belt which enjoys a tropical or subtropical climate. Within that zone there are three areas of diversity, each of which has about seven genera occurring more or less sympatrically. These areas are: i) the northern half of Cape York Peninsula; ii) the Wet Tropics zone between Cooktown and Townsville; and iii) the region comprising the SE corner of Queensland and the NE corner of New South Wales.

This paper redescribes 14 of the 15 genera currently included in the subfamily Oncomerinae; the remaining genus, *Tibiospina*, was recently described (Sinclair, 2000). Redescriptions are necessary as the majority of these genera were described in the nineteenth century. The generic redescriptions have required a redescription of the subfamily.

An interesting aspect of their little known biology is nymphal phoresy, which occurs in the females of at least three genera: *Cumare pallida* Blötc, *Peltocopta crassiventris* (Bergroth)

(Monteith, 1998) and *Garceus fidelis* Distant (this paper).

#### MATERIALS AND METHODS

*Specimens Examined.* Wherever possible, at least five adult females and five adult males of each species listed under the generic descriptions were examined. Abbreviations: \* = Type/s; P = photo.

*Genitalia Preparation and Descriptions.* Genital segments were cleared by immersion in boiling 10-15% potassium hydroxide for 5-30 minutes. After several washes in tap water the segments were dissected using fine jewellers forceps and micropins mounted on the apex of matchsticks. The aedeagus was teased into its fully everted state using fine jewellers forceps to grasp the basal plates of the aedeagal phallosoma, and another pair to grasp the base of the vesica inside the phallosoma. After examination in tap water or 70% alcohol the genitalia were stored in glycerine-filled microvials beneath the specimen. Descriptions of the fully everted male aedeagus were made viewing the aedeagus in profile while it lay on its side in the natural position. The terms 'distal' and 'proximal' conjunctival processes are applied in a relative sense following Kumar & Ghauri (1970). Descriptions of the spermatheca commence from the bulb-end of the duct.

*Line Drawings.* Line drawings were made using a camera lucida attached to a binocular microscope.

*Systematic Descriptions.* A diagnosis and description is given for the subfamily Oncomerinae and for each included genus within it (for *Tibiospina*, see Sinclair, 2000). Diagnostic

characters are unique at the subfamily level (when compared to the two other tessaratomid subfamilies) or the generic level (when compared to other oncomerine genera).

Generic synonymies and homonymies were given by Rolston et al. (1993), and are not repeated here unless there are significant references omitted by those authors.

For each generic description: 1) body length is the maximum length from the jugal apex to the abdominal apex; 2) head width versus length is the maximum width across the lateral margins of the compound eye when compared to the distance from the jugal apex to an imaginary line drawn between the ocelli; 3) when sternum 2 is stated as being medially 'simple' the area is convex or ridge-like rather than being modified into a tubercle or spine; 4) when the intersegmental suture of abdominal sterna 2-3 terminates dorso-laterally on the lateral margin of the abdomen (e.g. Fig. 5C) the first (basalmost) laterotergite seen in a dorsal view of the abdominal tergum is laterotergite 2 (e.g. Fig. 5D). When the intersegmental suture of abdominal sterna 2-3 terminates dorsoanteriorly on the lateral margin of the abdomen (e.g. Fig. 5B) 'laterotergite 2' becomes sublateral in position, with the anterior margin of laterotergite 3 forming an angulate wedge lateral to it. Laterotergite 3 is thus the first (basalmost) abdominal laterotergite.

*Food Plants.* In the Biology section for each genus the higher botanical classification used for recorded foodplants follows Mabberley (1989). Some of the foodplant information is presented in Schaefer & Ahmad (1987).

## SYSTEMATICS

### Subfamily ONCOMERINAE Stål

TYPE GENUS. *Oncomeris* Laporte, 1832.

**DIAGNOSIS.** Base of hemelytral membrane with two or less basal cells (basal cells usually absent) (Figs 1, 2, 3, 4A,B); veins R+M and Cu of hindwing parallel and narrowly separated or contiguous on proximal 2/3 (Fig. 4D); paratergites 9 of female separated medially by proctiger (Fig. 5E).

**DESCRIPTION.** Body length 12-43mm.

*Head.* Preocular tubercle absent; antennal segment 2 rounded-prismatic in cross section; rostral apex reaching mesosternum or metasternum.

*Thorax.* Coriomembranal suture of fore wing concave-sinuate (Figs 1, 2, 3, 4A,B); hind wing

lacking a A1 (=Pcu) stridulitrum; metathoracic scent gland ostiole with prominent spout on anterior margin (Fig. 5B,C); prosternum medially flat to weakly sulcate, if sulcate, never bounded laterally by posteriorly convergent, acutely to laminately produced carinae. *Legs.* Hind femora of male unarmed on subbasal inferior surface; tarsi 3-segmented.

*Female genitalia.* Paratergite 8 not or weakly expanded laterally compared to paratergite 9; spermathecal duct tubular between bulb and distal flange.

*Male genitalia.* Sternum 8 concealed by sternum 7; basal dorsal surface of ejaculatory reservoir unmodified; parameres when present uniramous, elongate.

**REMARKS.** Leston (1955a) divided the subfamily Oncomerinae into subtribes Piezosternaria (for the genus *Piezosternum*) and Oncomeraria (for all other oncomerine genera). This was based on the following characters. Piezosternaria: vesica long, flexible, coiled; metasternum produced forwards into a long, wide-based spine; Ethiopian and Neotropical. Oncomeraria: Vesica rigid or semi-rigid, not elongate and coiled; metasternum flat or swollen but never produced forwards; Oriental and Australasian. This division is not recognised here as the flexible vesica state found in *Piezosternum* also occurs in *Agapophyta* and *Neosalica*. A more appropriate division would be *Piezosternum* and *Neosalica* versus all remaining oncomerine genera, as the external opening of the male pygophore is situated dorsally in *Piezosternum* and *Neosalica* (e.g. Fig. 6D) and posteriorly in all other Oncomerinae (e.g. Fig. 6B,C).

### KEY TO GENERA OF ONCOMERINAE

1. Pronotum produced posteriorly over scutellar base (e.g. Fig. 4A) . . . . . 2  
Pronotum terminating at scutellar base. . . . . 4
2. Metasternum with broad carina produced anteriorly and adpressed to mesosternum (Fig. 6G) . . . . . *Piezosternum*  
Metasternum lacking broad carina or if broad carina present, not produced anteriorly. . . . . 3
3. Pronotal lateral angles produced as acute spines (Fig. 4B) . . . . . *Neosalica*  
Pronotal lateral angles roundly produced . . . . . *Tibiospina* (see Sinclair, 2000)
4. Medial area of abdominal sternum 3 produced anteriorly as a distinct spine (e.g. Fig. 6E,H) . . . . . 5  
Medial area of abdominal sternum 3 simple or tuberculate (e.g. Fig. 6F,G) . . . . . 11

5. Apex of abdominal sternum 3 spine reaching metasternum; mesosternal xyphus produced posteriorly as a bifurcation (Fig. 6E) . . . . . *Agapophyta*  
Apex of abdominal sternum 3 spine reaching mesosternum or (occasionally) prosternum; mesosternal xyphus simple, tumid or carinate . . . . . 6
6. Fore femora with a prominent spine on ventral subapical anterior margin . . . . . 7  
Fore femora unarmed on ventral subapical anterior margin. . . . . 8
7. Pronotal anterolateral margins produced as curved (in dorsal view), variably explanate processes (Fig. 3B); hind tibiae flattened (Fig. 4E) . . . . . *Oncomeris*  
Pronotal anterolateral margins not produced, sublinear (in dorsal view) (Fig. 3C); hind tibiae dilated subbasally on inner margins (Fig. 4F) . . . . . *Plisthenes*
8. Ostiolar spout long when compared to distance from ostiole to dorsal extremity of ostiolar plate (Fig. 5B) . . . . . *Garceus*  
Ostiolar spout short when compared to distance from ostiole to dorsal extremity of ostiolar plate (Fig. 5C) . . . . . 9
9. Abdomen in dorsal view with lateral margins highly convex at base (Fig. 1B); head longer than wide in dorsal view . . . . . *Erga*  
Abdomen in dorsal view with lateral margins weakly convex at base; head wider than long in dorsal view . . . . . 10
10. Abdomen in dorsal view with lateral margins strongly tapered posteriorly (Fig. 3D) . . . . . *Iyamorphia*  
Abdomen in dorsal view with lateral margins weakly tapered posteriorly (Fig. 2D) . . . . . *Tamolita*
11. Hind tibiae bearing two distinct 'teeth' on inner margins (Fig. 5A) . . . . . *Rhoecus*  
Hind tibiae unarmed on inner margins . . . . . 12
12. Antennae 4-segmented; mesosternal xyphus bicarinate, sulcate medially . . . . . *Stilida*  
Antennae 5-segmented; mesosternal xyphus simple or longitudinally carinate . . . . . 13
13. Body distinctly flattened in cross section; anterolateral pronotal margins and abdominal lateral margins foliaceous (Fig. 1C) . . . . . *Peltocopta*  
Body flattened or biconvex in cross section; anterolateral pronotal margins and abdominal lateral margins acutely produced. . . . . 14
14. Rostral segment 1 enclosed by bucculae; scutellar apex reaching to abdominal tergite 5. . . . . *Cumare*  
Rostral segment 1 surpassing bucculae posteriorly; scutellar apex reaching to abdominal tergite 4 . . . . . *Musgraveia*

GENERIC DESCRIPTIONS

**Agapophyta** Guerin, 1831

TYPE SPECIES. *Agapophyta bipunctata* Guerin, 1831.

DIAGNOSIS. Apex of scutellum bifurcate (Fig. 1A); mesosternal xyphus produced posteriorly as a bifurcation, adpressed to metasternum laterally (Fig. 6E); posterior half of metasternum medially broadly sulcate to receive entire dorsal surface of third abdominal sternal spine (Fig. 6E);

spermathecal duct below the proximal flange initially slender then variably dilated and coiled to its base (see Kumar, 1969; fig. 91).

DESCRIPTION. Body length 13-20mm; dorsal view (Fig. 1A).

*Head.* Wider than long; antennae 4-segmented, apex reaching scutellum; jugae medially contiguous anterior to tylus; rostral apex reaching mesosternum.

*Thorax.* Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex reaching from abdominal terga 5-7; hamus of hind wing absent; mesosternum with anterior medial tubercle, xyphus broadly swollen, remainder as in diagnosis; metasternum tumid, posterior margin not produced over second abdominal sternum, remainder as in diagnosis.

*Abdomen.* Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly (e.g. Fig. 5B); sternum 2 medially simple; sternum 3 medially with apex of spine reaching metasternum.

*Legs.* Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

*Female Genitalia.* Sclerotised rami present; spermathecal bulb spherical in profile, spermathecal duct as in diagnosis.

*Male Genitalia.* Pygophore, external opening posterior in position; aedeagus, vesica forming a mostly membranous tube; conjunctiva with at least one pair of mostly sclerotised latero-proximal processes (see Kumar, 1969; fig. 66).

INCLUDED SPECIES. *A. astridae* Schouteden, 1933, \*♀; *A. anrantiaca* Blöte, 1945, \*♂; *A. bipunctata* Guerin, 1831, ♂ ♀; *A. boschmai* Blöte, 1945, ♂ ♀; *A. distincta* Blöte, 1952, ♂; *A. occidentalis* Blöte, 1945, \*♂, ♂; *A. similis* Blöte, 1945, P; *A. undescribed species*, Mt Kaindi, Papua New Guinea ♂ ♀; *A. ustulata* Blöte, 1945, \*♂ ♀, ♂ ♀; *A. vankampeni* Blöte, 1945, \*♂, ♂ ♀; *A. viridula* Blöte, 1945.

DISTRIBUTION. Australia (Qld, as far south as Cardwell); New Guinea; Woodlark Island; Bismarck Archipelago (Duke of York Island, New Britain, New Ireland); Solomon Islands (Kei and Kilinailau Islands); Moluccas (Aru, Buru, Misool and Salawati Islands); Sulawesi; Sumatra: Java; Malay Peninsula (West Malaysia).

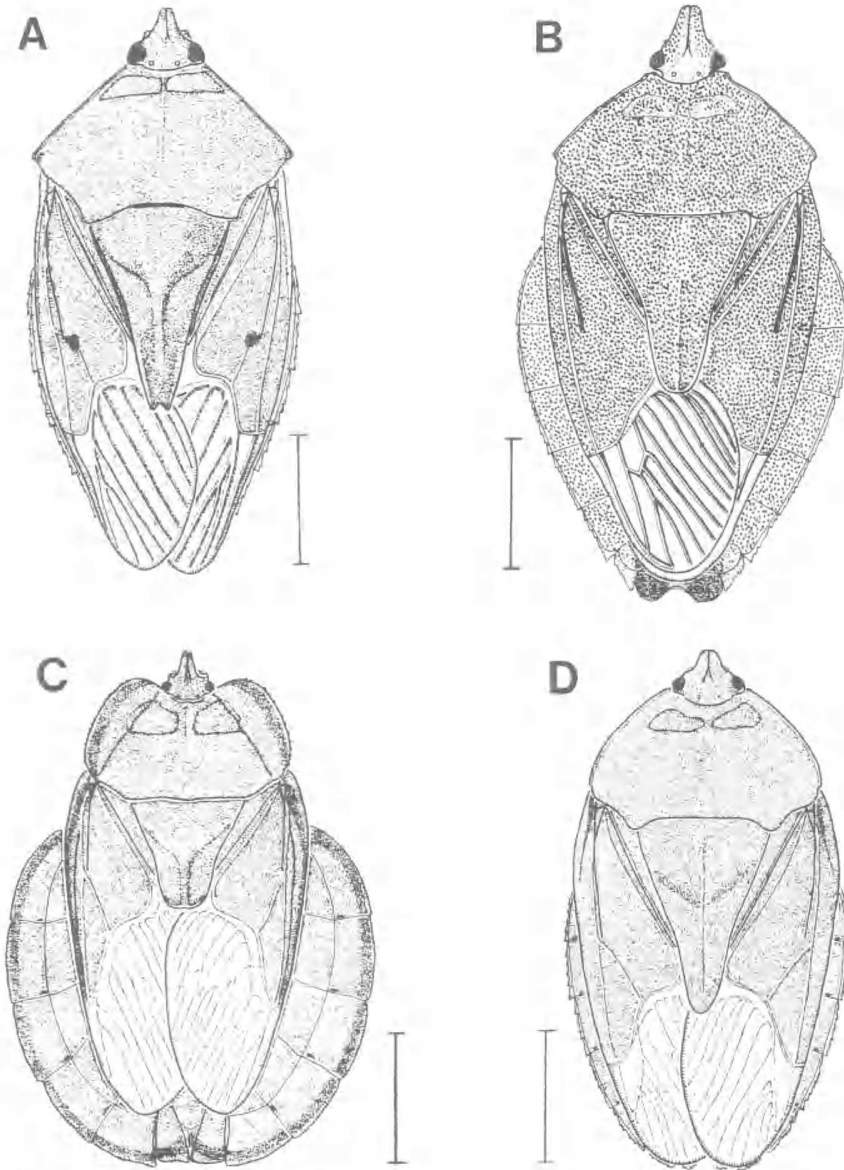


FIG. 1. Adults, dorsal view; A, *Agapophyta bipunctata* Guerin; B, *Erga longitudinalis* (Westwood); C, *Peltocopta crassiventris* (Bergroth); D, *Garceus fidelis* Distant. Scale bars: A = 3.98mm, B = 3.44mm, C = 6.66mm, D = 4.87mm.

Amyot & Serville (1843) listed *Agapophyta* from Tasmania (Australia). This record requires confirmation.

**BIOLOGY.** Foodplants. *A. bipunctata*: on shoots of *Cassia fistula* L. (Fabales: Leguminosae) (Kumar, 1969); on young leaves of *Cocos*

*nucifera* L. (Arecales: Palmae) (Szent-Ivany & Catley, 1960); on leaves of *Hibiscus* sp. (Malvales: Malvaceae) (Mr W. Foun, pers. comm.); *A. boschmai* on pods of *Leucaena leucocephala* (Lam.) de Wit (syn. *L. glauca* Benth.) (Fabales: Leguminosae) (label data); an *Agapophyta* sp. on shoots, flower buds of

*Cajanus cajan* (L.) Millsp. (Fabales: Leguminosae) (Young, 1984).

REMARKS. Apart from an undescribed species from Mt Kaindi, Papua New Guinea, and occasional specimens of *A. vankampeni*, all remaining species of *Agapophyta* have a black spot at the apex of the forewing medial fracture (see Fig. 1A). A typographical error in Rolston et al. (1993) gives the year of description of *A. boschmai* as 1845. The correct date is 1945. Kumar (1969) labelled the male aedeagal conjunctival processes as being ventrolateral and proximal in position in *A. bipunctata*. These processes are actually lateroproximal in position.

**Cumare** Blöte, 1945

TYPE SPECIES. *Cumare pallida* Blöte, 1945.

DIAGNOSIS. Body flattened in cross section; rostral segment 1 enclosed by bucculae.

DESCRIPTION. Body length 12-19mm; dorsal view (Fig. 2 A).

*Head*. Wider than long; antennae 5-segmented, apex reaching scutellum; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

*Thorax*. Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex reaching abdominal tergum 5; hamus of hind wing absent; mesosternum with anterior broad medial tubercle or tubercle absent; xyphus carinate to broadly carinate; metasternum swollen, with narrow medial longitudinal carina or carina absent; posterior margin not produced over second abdominal sternum, when produced reaching second abdominal sternum.

*Abdomen*. Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2 medially forming noticeably convex ridge; sternum 3 medially with anterior conical tubercle pressing anteriorly under abdominal sternum 2.

*Legs*. fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

*Female Genitalia*. Sclerotised rami absent; spermathecal bulb spherical in profile, spermathecal duct below the proximal flange usually slender, with lateral duct leading to sac-like expansion (see Kumar, 1969: fig. 90).

*Male Genitalia*. Pygophore, external opening posterior in position; aedeagus, vesica forming a sclerotised tube of variable profile; conjunctiva

with one pair of lightly sclerotised dorsolateral proximal processes; one pair of elongate, membranous, dorsolateral distal processes; one pair of membranous laterodistal processes (each process forming bifurcate lobes, one lobe directed towards phallosoma, other lobe away from phallosoma); one pair of elongate, lightly sclerotised ventrolateral distal processes (Fig. 61) (see also Kumar, 1969: figs 60, 61).

INCLUDED SPECIES. *Cumare pallida* Blöte, 1945, ♀♀, ♂♂; *Cumare* undescribed species, Kiunga, Papua New Guinea, ♀.

DISTRIBUTION. Australia (Qld, as far south as Brisbane); Papua New Guinea (Kiunga; Daru Island).

BIOLOGY. Foodplants, *C. pallida* on *Petalostigma* sp. (Euphorbiales: Euphorbiaceae) (G.B. Monteith, pers. comm.; label data).

REMARKS. The undescribed species from Kiunga is noticeably larger than *C. pallida*.

**Erga** Walker, 1868

TYPE SPECIES. *Erga longitudinalis* (Westwood, 1837a).

DIAGNOSIS. Dorsally, abdomen with lateral margins highly convex basally (Fig. 1B); spermathecal duct below proximal flange initially slender then distally dilated, latter subsequently narrowed as proximal dilation to base of duct (see Kumar, 1969: fig. 86); aedeagal conjunctiva of male with one pair of mostly sclerotised ventrolateral proximal processes (Fig. 7G).

DESCRIPTION. Body length 12-15.5mm; dorsal view (Fig. 1B)

*Head*. Longer than wide; antennae 5-segmented, apex reaching scutellum; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

*Thorax*. Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex reaching abdominal tergum 5; hamus of hind wing absent; mesosternum lacking anterior medial carina or tubercle, xyphus swollen with medial groove; metasternum swollen, concave posteriorly to receive dorsal subbasal surface of adpressed third abdominal sternal spine, posterior margin not produced over second abdominal sternum.

*Abdomen*. Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2 medially simple; sternum 3 medially with apex of spine reaching mesosternum.

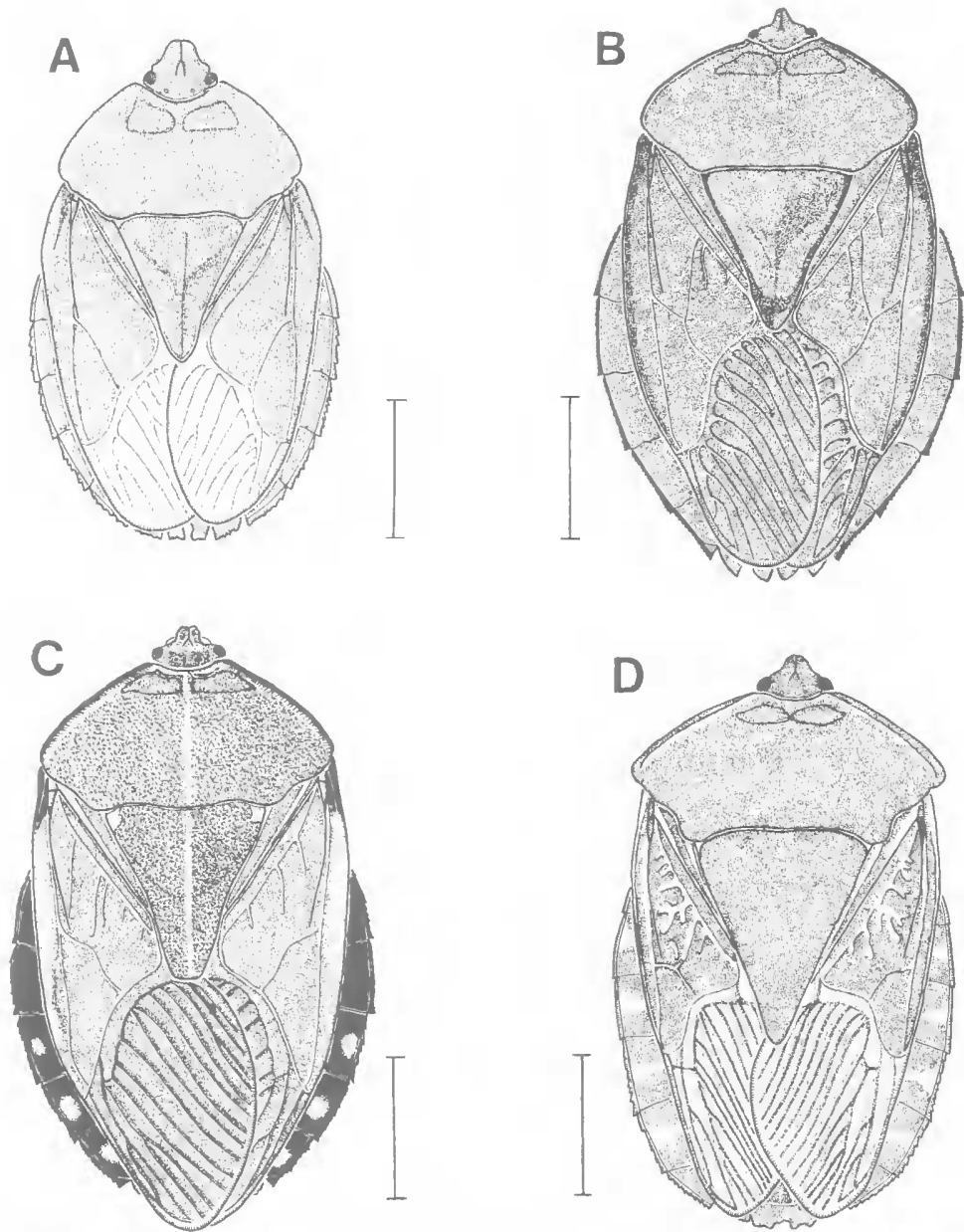


FIG. 2. Adults, dorsal view; A, *Cumare pallida* Blöte; B, *Stilida indecora* Stål; C, *Musgraveia sulciventris* (Stål); D, *Tamolia* sp. Scale bars: A = 4.37mm, B = 6.46mm, C = 5.88mm, D = 6.08mm.

*Legs.* Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

*Female Genitalia.* Sclerotised rami present; spermathecal bulb non-spherical in profile, spermathecal duct as in diagnosis.

*Male Genitalia.* Pygophore, external opening posterior in position; aedeagus: vesica forming a

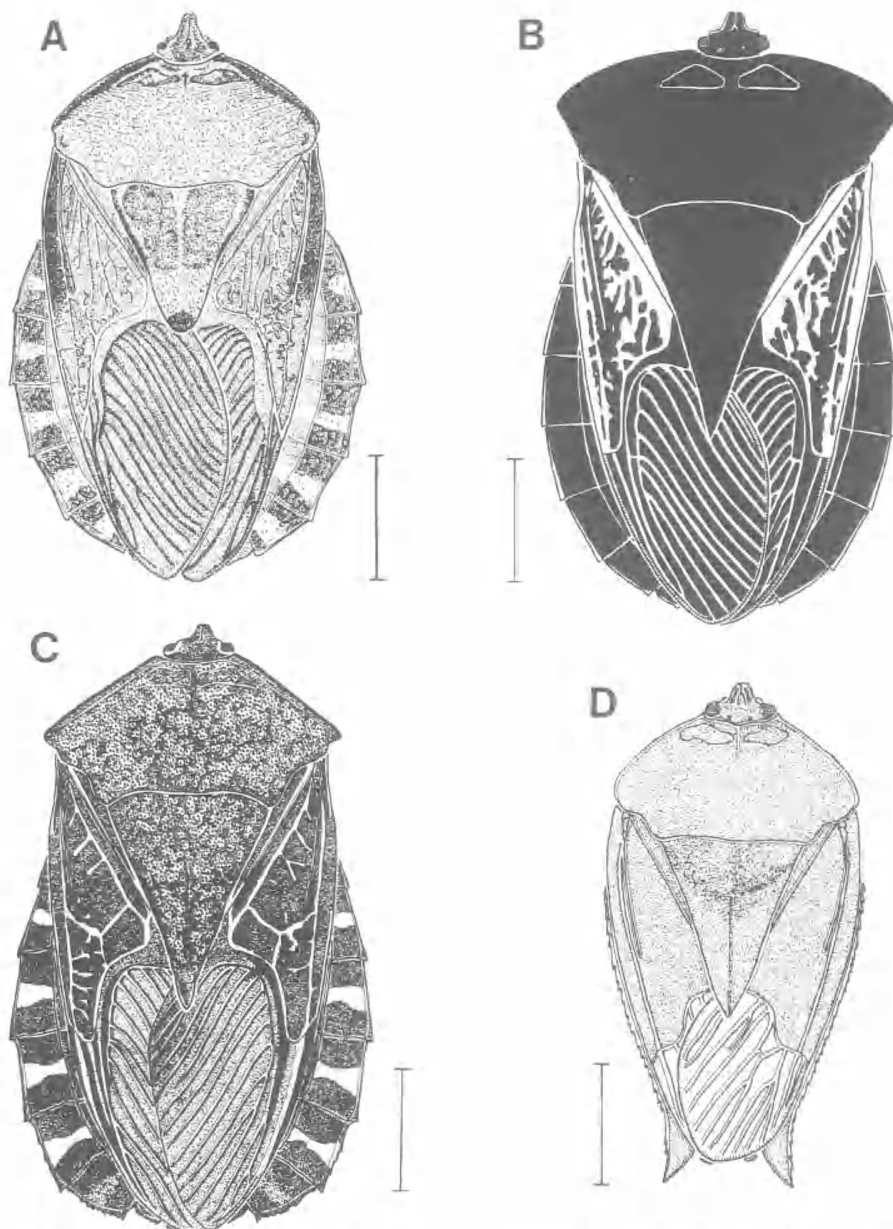


FIG. 3. Adults, dorsal view; A, *Rhoecus australasiae* (Westwood); B, *Oncomeris* sp.; C, *Plisthenes merianae* (Fabricius); D, *Lyramorpha rosea* Westwood. Scale bars: A=7.39mm, B=6.90mm, C=7.21mm, D=5.34mm.

sclerotised tube of variable profile; aedeagal conjunctiva with: one pair of membranous dorso-medial distal process; one pair of membranous ventrolateral distal processes (Fig. 7G), remainder as in diagnosis (see also Kumar, 1969: fig. 43).

INCLUDED SPECIES. *Erga longitudinalis* Westwood, 1837, \*♀, ♂♀.

DISTRIBUTION. Australia (Qld, NSW). Records from Tasmania and 'New Guinea' require confirmation (see also Gross, 1975: 79).

**BIOLOGY.** The biology of *E. longitudinalis* is briefly discussed by Kumar (1969). Foodplants: *E. longitudinalis* on shoots of *Austrosteenisia blackii* (F. Muell.) R. Geesink (syn. *Lonchocarpus blackii* F. Muell.) (Fabales: Leguminosae) (Kumar, 1969).

**REMARKS.** This genus may be confused with the genus *Agapophyta* (Fig. 1A).

#### **Garceus** Distant, 1893

**TYPE SPECIES.** *Garceus fidelis* Distant, 1893.

**DIAGNOSIS.** Body weakly flattened in cross section; ostiolar spout long when compared to distance from ostiole to dorsal extremity of ostiolar plate (Fig. 5B).

**DESCRIPTION.** Body length: 17-22mm; dorsal view (Fig. 1D).

*Head.* Wider than long; antennae 5-segmented, apex reaching scutellum; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

*Thorax.* Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex reaching abdominal tergum 5; hamus of hind wing absent; mesosternum with anterior medial carina; xyphus broad, swollen; metasternum weakly convex, concave posteriorly to receive dorsal subbasal surface of adpressed third abdominal sternal spine, posterior margin not produced over second abdominal sternum.

*Abdomen.* Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2 simple medially; sternum 3 medially with apex of spine reaching mesosternum.

*Legs.* Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

*Female Genitalia.* Sclerotised rami absent; spermathecal bulb spherical in profile, spermathecal duct below proximal flange usually slender, with lateral duct leading to a sac-like expansion (Fig. 6A).

*Male Genitalia.* Pygophore, external opening posterior in position; aedeagus, vesica forming a sclerotised tube of variable profile; conjunctiva with: one pair of small dorsolateral distal processes; one pair of lightly sclerotised lateroproximal processes; one pair of large, membranous latero-distal processes; one pair of lightly sclerotised ventrolateral proximal processes (Fig. 7H).

**INCLUDED SPECIES.** *Garceus fidelis* Distant, 1893, ♂ ♀.

**DISTRIBUTION.** Australia (Wet Tropics area, N Qld). A record from Peak Downs in the semi-arid inland near Clermont requires confirmation.

**BIOLOGY.** The biology and foodplants of the genus are unknown. Four large dead nymphs were found adhered to the basal, ventral surface of the abdomen in a dead pinned female from the NMNH collected in the early 1900s by J.F. Illingworth at Babinda in N Queensland. These four nymphs were separated from the female and stored in an associated plastic vial.

#### **Lynamorpha** Westwood, 1837a

**TYPE SPECIES.** *Lynamorpha rosea* Westwood, 1837a.

**DIAGNOSIS.** Dorsally, abdomen in dorsal view with lateral margins strongly tapered posteriorly (Fig. 3D).

**DESCRIPTION.** Body length 16.5-30mm; dorsal view (Fig. 3D).

*Head.* Wider than long; antennae usually 5-segmented (4-segmented in *L. rosea*), apex reaching scutellum; jugae usually contiguous medially anterior to tylus; rostral apex usually reaching mesosternum.

*Thorax.* Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex reaching from abdominal terga 5-6; hamus of hind wing absent; mesosternum with anterior medial tubercle, xyphus swollen; metasternum convex, concave posteriorly to receive dorsal subbasal surface of adpressed third abdominal sternal spine, posterior margin not produced over second abdominal sternum.

*Abdomen.* Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2 medially simple; sternum 3 medially with apex of spine reaching mesosternum.

*Legs.* Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

*Female Genitalia.* Sclerotised rami usually absent (present in *L. rosea*); spermathecal bulb usually spherical in profile (non-spherical in *L. maculifera*); spermathecal duct below proximal flange slender, with lateral duct leading to a sac-like expansion (see Kumar, 1969: figs 82, 83, 84).

*Male genitalia.* Pygophore, external opening posterior in position; aedeagus, vesica forming a



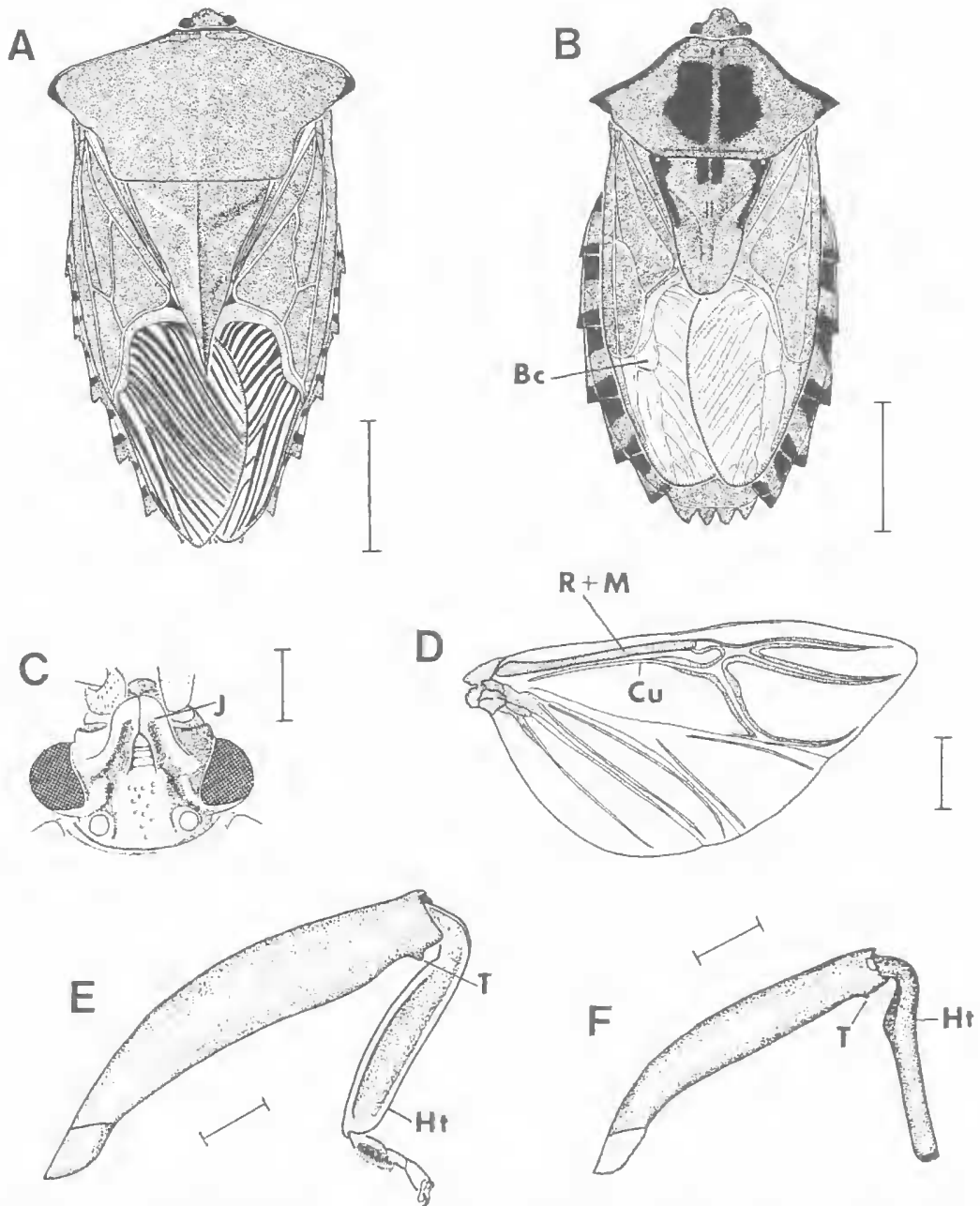


FIG. 4. A,B, Adults, dorsal view; A, *Piezosternum subulatum* (Thunberg); B, *Neosalica pedestris* (Breddin). C, *Piezosternum subulatum*, head, dorsal view. D, *Tamolia* sp., right hindwing, dorsal view. E,F, left hindleg, ventral view; E, *Oncomeris* sp.; F, *Plisthenes dilatatus* (Montrouzier). Abbreviations: Bc, basal cell; Cu, vein Cu; Ht, hindtibia; J, jugum; R+M, veins R and M; T, tooth. Scale bars: A = 5.33mm, B = 5.00mm, C = 0.78mm, D = 2.40mm, E = 3.42mm, F = 3.70mm.

sclerotised tube of variable profile. Conjunctiva: usually lacking one pair of basally medially fused, apically bifurcate, sclerotised dorsomedial distal process (present in *L. brongersmai* (Fig. 7D,E) and *L. maculifera*); usually with two pairs of variably sclerotised dorsolateral distal processes (e.g. Fig. 7C,D,E) (one pair present in *L. impar*, *L. soror* and *L. edulis* (Fig. 7A,B)); one pair of usually basally bifurcate, at least lightly sclerotised, lateroproximal processes present (e.g. Fig. 7C) (one arm of each process situated ventrolaterally, distally in *L. edulis* [Fig. 7A,B]) (processes uniramous in *L. brongersmai* (Fig. 7D) and *L. maculifera*).

**INCLUDED SPECIES.** Subgenus *Diploxiphus*: *L. brongersmai* Blöte, 1952, \*♂♀, ♂♀; *L. horvathi* Blöte, 1952, \*♂♀; *L. maculifer* Tryon, 1892, ♂♀; Subgenus *Lyramorpha*: *L. rosea* Westwood, 1837a, \*♂, ♂♀; Subgenus *Lyrodes*: *L. ambigua* Horvath, 1900a, ♀; *L. basalis* Horvath, 1900b, \*♀; *L. breddini* Horvath, 1900a, ♂♀; *L. diluta* Stål, 1863, ♂♀; *L. edulis* Blöte, 1952, \*♂♀, ♂♀; *L. impar* Horvath, 1900a, ♂; *L. parens* Breddin, 1900, ♂♀; *L. persimilis* Horvath, 1900a, ♂♀; *L. picta* Distant, 1893; *L. plagifer* Blöte, 1952, \*♂♀; *L. soror* Breddin, 1900, ♂♀; *L. vollenhoveni* Stål, 1867, ♂♀; Incertae sedis: *L. perelegans* Vollenhoven, 1868, \*♂♀, ♂♀.

**DISTRIBUTION.** Australia (Qld, NSW); New Guinea (including Fakfak and Yule Islands); Moluccas (Aru, Bachan, Halmahera, Morotai, Waigeo and Salawati Islands); Sulawesi; Malay Peninsula (West Malaysia). Australian records from Victoria and South Australia require confirmation.

**BIOLOGY.** The biology of *L. rosea* is briefly discussed by Kumar (1969). Foodplants: *L. rosea* on: *Cupaniopsis anacardioides* (A. Rich.) Radlk. (Kumar, 1969); *Alectryon excelsum* Gaertn. (label data); shoots of *Guioa semiglauca* (F.Muell.) Radlk. (this paper); *Litchi* sp. (label data). All plants belong to the Sapindales: Sapindaceae.

**REMARKS.** The abdominal disc is often suffused with metallic blue, green and purple colours.

#### **Musgraveia** Leston & Scudder, 1957

*Musgravea* McDonald, 1966: 59 (incorrect subsequent spelling).

**TYPE SPECIES.** *Musgraveia sulciventris* (Stål, 1863).

**DIAGNOSIS.** Abdominal sterna medially longitudinally bicarinate (particularly towards abdominal apex) (flat in females of *M. sulciventris*).

**DESCRIPTION.** Body length 17.5-24.5mm; dorsal view (Fig. 2C).

**Head.** Wider than long; antennae 5-segmented, apex reaching hemelytral membrane; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

**Thorax.** Posterior pronotal margin terminating at scutellar base; scutellum as wide as long to longer than wide, apex reaching abdominal tergum 4; hamus of hind wing absent (*M. sulciventris*) or present (*M. antennatus*); mesosternum lacking anterior medial carina or tubercle, xyphus flat, broad; metasternum swollen, posterior margin not produced over second abdominal sternum.

**Abdomen.** Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2 medially simple; sternum 3 medially with anterior tubercle.

**Legs.** fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface bearing a tubercle.

**Female Genitalia.** Sclerotised rami present (*M. sulciventris*) or absent (*M. antennatus*); spermathecal bulb non-spherical in profile, spermathecal duct below the proximal flange usually slender, with lateral duct leading to a sac-like expansion (see Kumar, 1969: figs 80, 81).

**Male Genitalia.** Pygophore: external opening posterior in position; aedeagus: vesica forming a sclerotised tube of variable profile; conjunctiva: *M. sulciventris*: one pair of very large membranous dorsoproximal processes (latter fused medially for majority of length, each process with ventrally-directed lobe); one pair of mostly sclerotised, apically-bifurcate, membranous, dorsomedial distal processes (see Kumar, 1969: figs 25, 26, 27, here refigured [Fig. 7I,J]); *M. antennatus*: one pair of long, sclerotised dorsolateral distal processes; one pair of lightly sclerotised lateroproximal processes (Fig. 8A) (see also Kumar, 1969: fig. 29).

**INCLUDED SPECIES.** *M. antennatus* Distant, 1880, ♂♀; *M. sulciventris* Stål, 1863, ♂♀.

**DISTRIBUTION.** Papua New Guinea (Mabu Duan); Australia (Qld, NSW, as far south as Wollongong).

**BIOLOGY.** The biology of *M. sulciventris* has been well studied as it is a minor economic pest

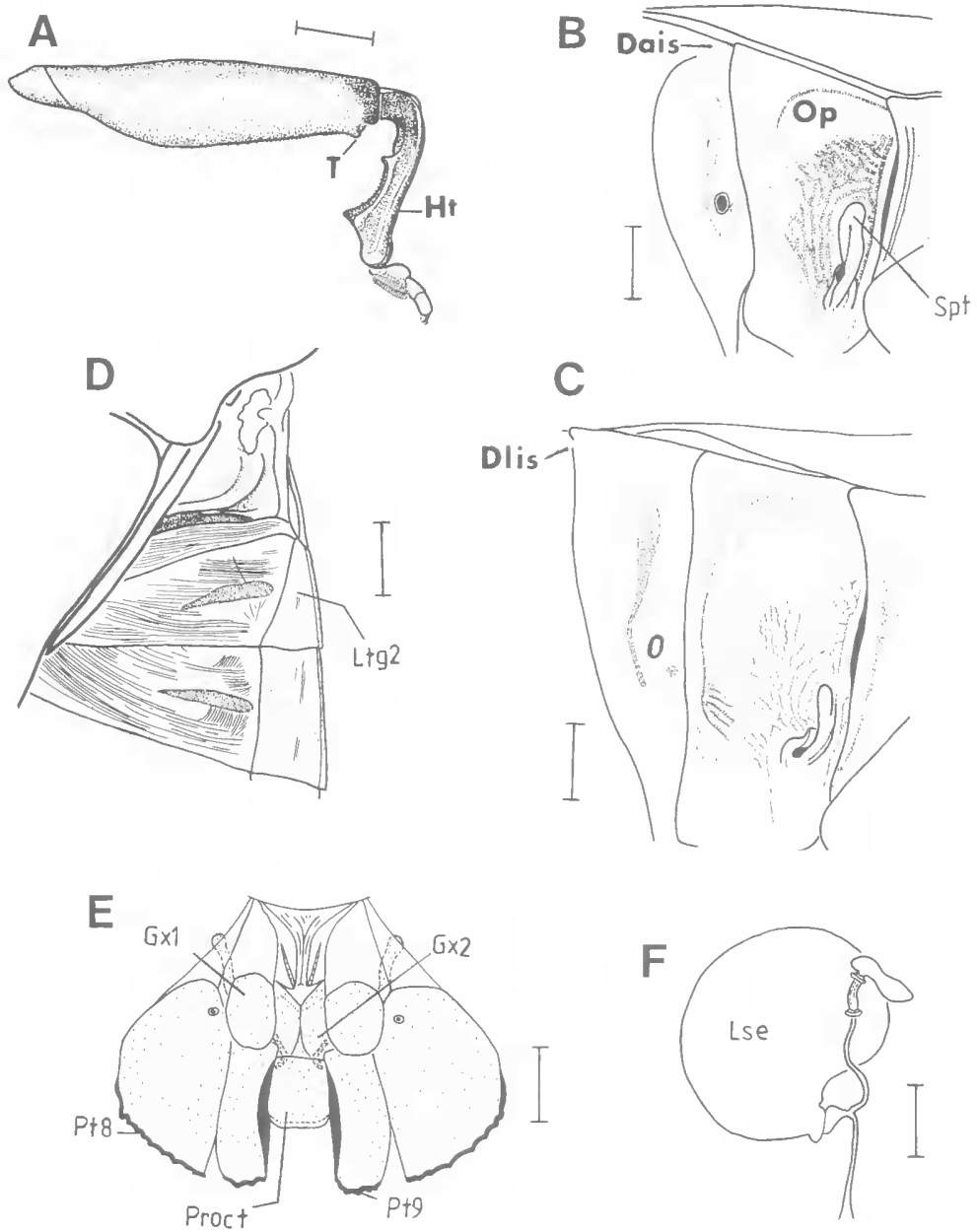


FIG. 5. A, *Rhoecus australasiae*, left hindleg, ventral view. B,C, right side of body, area surrounding ostiole of metathoracic scent gland; B, *Garceus fidelis*; C, *Tamolia* sp. D, *Tamolia* sp., dorsal view, right side of thorax-abdomen junction. E, *Garceus fidelis*, ventral view, external ♀ genitalia, (abdominal segments 8,9 removed from abdomen). F, *Tamolia*, sp., Spermatheca. Abbreviations: Dais, dorsoanterior termination of intersegmental suture of abdominal sterna 2-3; Dlis, dorsolateral termination of intersegmental suture of abdominal sterna 2-3; Gx1, gonocoxa 1; Gx2, gonocoxa 2; Ht, hindtibia; Lse, lateral sac-like expansion of spermathecal duct; Ltg2, laterotergite 2; Op, ostiolar plate; Pt8, paratergite 8; Pt9, paratergite 9; Proct, proctiger; Spt, spout; T, tooth; Scale bars: A = 4.00mm, B = 1.07mm, C = 1.15mm, D = 1.50mm, E = 1.00mm, F = 0.78mm.

on cultivated citrus. Major articles include, *inter alia*, Froggatt (1901, 1907), Girault (1924), Hely (1938, 1944, 1964, 1968), Hely et al. (1982), McDonald (1969), Olliff (1892), Summerville (1935), Smith (1983), Tryon (1889, 1923a,b,c) and Veitch & Simmonds (1929). Foodplants: *M. sulciventris* on: leaf nodules, petioles, flower pedicles, fruit, shoots of *Citrus glauca* (Lindl.) Burkill [syn. *Eremocitrus glauca* (Lindl.) Swingle] (Hely, 1968); *Citrus australis* (A. Cunn. ex Mudie) Planch. [syn. *Microcitrus australis* (A. Cunn. ex Mudie)] (Summerville, 1935); *Citrus australasica* F. Muell. [syn. *Microcitrus australasica* (F. Muell.) Swingle] (Tryon, 1923a); *Citrus aurantium* L. (Kirkaldy, 1909); *Citrus limou* Burm. f. (Kirkaldy, 1909). *M. antennatus* on *Citrus aurantifolia* Swingle (label data). All plant records above are from the Sapindales: Rutaceae.

**Neosalica** Distant, 1882

TYPE SPECIES. *Neosalica pedestris* Distant, 1882.

DIAGNOSIS. Pronotal lateral angles produced laterally as acute spines (Fig. 4B); mesosternal xyphus tumid, with transverse carina extending around periphery between furcal pits (Fig. 6F); gonopore of male aedeagal ejaculatory duct situated on dorsal surface of vesica (see Kumar, 1969: fig. 77, here refigured [Fig. 8I]); spermathecal bulb of female genitalia elongate, weakly coiled apically (see Kumar, 1969: fig. 93); spermathecal duct below proximal flange initially slender then distally dilated, latter long and convoluted, subsequently slender followed by proximal dilation at base of duct (see Kumar, 1969: fig. 93).

DESCRIPTION. Body length 19.5-26mm; dorsal view (Fig. 4B) (see also Leston, 1955b: fig. 6).

*Head.* Wider than long; antennae 5-segmented, apex reaching scutellum; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

*Thorax.* Posterior pronotal margin produced over scutellar base; scutellum longer than wide, apex reaching abdominal tergum 4; hamus of hind wing present; mesosternum with anterior medial carina, xyphus as in diagnosis; metasternum carinate, narrowed apex, and basal angles, weakly produced, posterior margin not produced over second abdominal sternum.

*Abdomen.* Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2

medially simple; sternum 3 medially with obsolescent broadly truncate tubercle.

*Legs.* Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

*Female Genitalia.* Sclerotised rami present; spermathecal bulb as in diagnosis; spermathecal duct as in diagnosis.

*Male Genitalia.* Pygophore, external opening dorsal in position; aedeagus, vesica forming a mostly membranous tube; conjunctiva with: one pair of elongate, membranous, dorsolateral distal processes; one pair of mainly sclerotised latero-proximal processes; one sclerotised, bulbous ventromedial distal process (Fig. 8I).

INCLUDED SPECIES. *N. forbesi* Distant, 1882, \*♂; *N. pedestris* Breddin, 1902, \*♂ ♀.

DISTRIBUTION. China (Yunnan), India (North India, Sikkim), Korea, Myanmar, Vietnam, Sumatra.

BIOLOGY. Biology and foodplants unknown.

**Oncomeris** Laporte, 1832

TYPE SPECIES. *Oncomeris flavicornis* (Guerin, 1831)

DIAGNOSIS. Hind tibiae flattened (Fig. 4E); one pair of 'teeth' present on dorsal rim of male pygophore above base of proctiger (one on each side of latter) (Fig. 6B); body with dark brown-black ground colour and hemelytra often with variable shades of orange to red-brown.

DESCRIPTION. Body length 22-43mm; dorsal view (Fig. 3B).

*Head.* Wider than long; antennae 4-segmented, apex reaching scutellum; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

*Thorax.* Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex reaching abdominal tergum 5; hamus of hind wing absent; mesosternum lacking an anterior medial carina or tubercle; xyphus swollen; metasternum convex, concave posteriorly to receive dorsal subbasal surface of adpressed third abdominal sternal spine, posterior margin not produced over second abdominal sternum.

*Abdomen.* Intersegmental suture of abdominal sterna 2-3 terminating dorsolaterally (Fig. 5C); sternum 2 medially simple; sternum 3 medially with apex of spine usually reaching mesosternum (occasionally to prosternum).

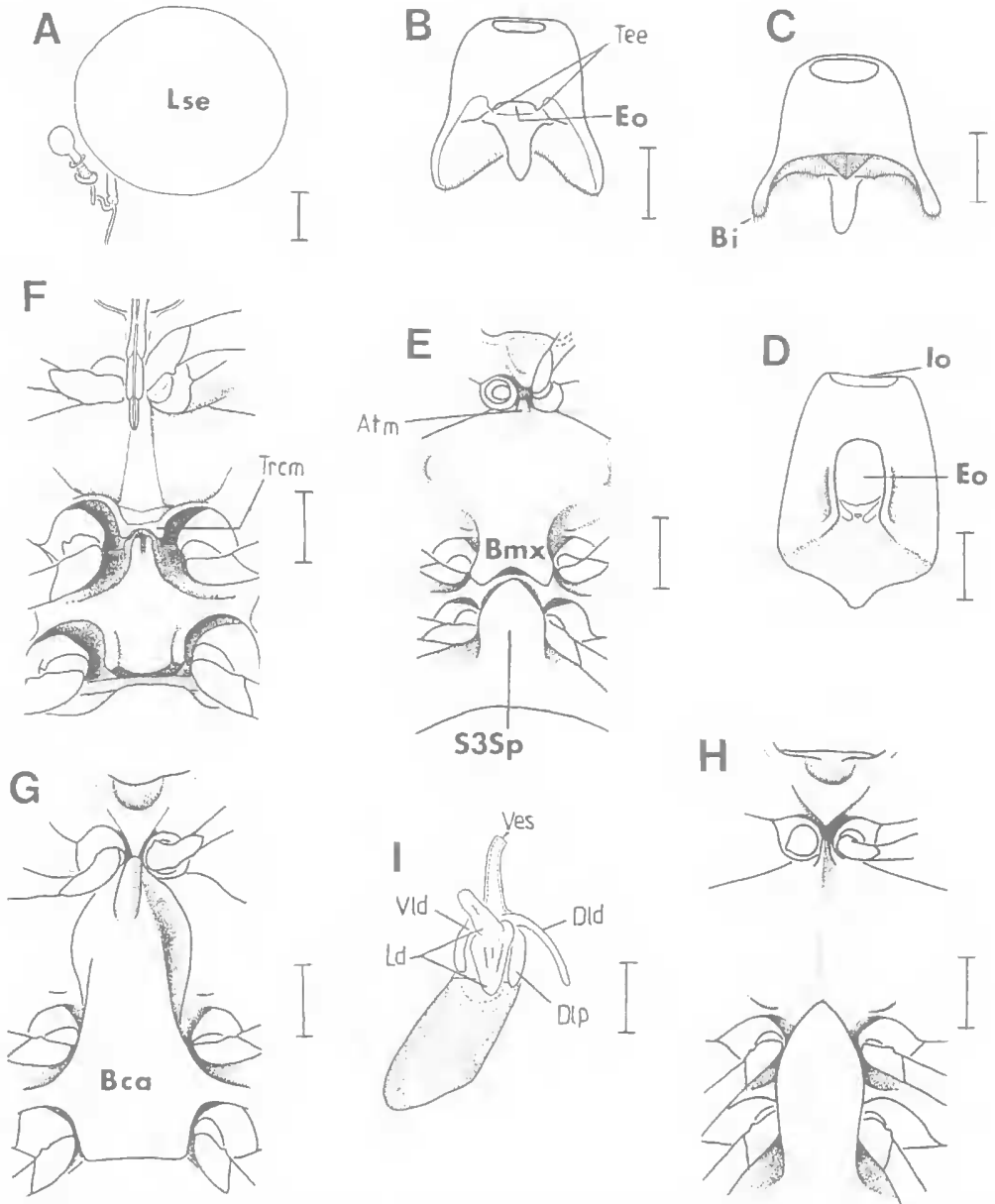


FIG. 6. A, *Garcens fidelis*, spermatheca. B-D, ♂ pygophore, dorsal view; B, *Oncomeris flavicornis* (Guerin); C, *Plisthenes scutellatus* distant; D, *Neosalica pedestris*. E-H, thoracic sterna and basal abdominal segments, ventral view; E, *Agapophyta bipunctata* Guerin; F, *Neosalica forbesi* Distant; G, *Piezosternum subulatum*; H, *Garcens fidelis*. I, *Cumare pallida*, aedeagus, lateral view, right side. Abbreviations: Atm, anterior mesosternal tubercle; Bca, broad metasternal carina; Bi, bifurcation of mesosternal xyphus; Bmx, bifurcation of mesosternal xyphus; Dld, dorsolateral distal conjunctival process; Dlp, dorsolateral proximal conjunctival process; Eo, external opening of pygophore; Io, internal opening of pygophore; Ld, laterodistal conjunctival process; Lse, lateral sac-like expansion of spermatheca; S3Sp, spine of abdominal sternum 3; Tee, teeth; Trem, transverse mesosternal carina; Ves, vesica; Vld, ventrolateral distal conjunctival process. Scale bars: A = 0.78mm, B = 2.70mm, C = 2.00mm, D, E = 1.50mm, F = 1.90mm, G = 1.38mm, H = 1.18mm, I = 0.39mm.

*Legs.* Fore femora on subapical, anterior margin of inferior surface armed with a prominent spine; hind femora of male inerassate when compared to mid and hind femora, subapical inferior surface bearing a tubercle (Fig. 4E).

*Female Genitalia.* Sclerotised rami present; spermathecal bulb non-spherical in profile, spermathecal duct below proximal flange slender, with lateral duct leading to a sae-like expansion (see Kumar, 1969: fig. 87).

*Male Genitalia.* Pygophore, external opening posterior in position; aedeagus, vesica forming a mostly sclerotised tube of variable profile; conjunctiva with: one pair of sclerotised, dorsolateral proximal processes; one pair of elongate, sclerotised, apically membranous, dorsolateral distal processes; one pair of sclerotised ventromedial processes (Fig. 8G,H) (see also Kumar, 1969: figs 46, 47).

INCLUDED SPECIES. *O. bernsteinii* Vollenhoven, 1868, ♂ ♀; *O. chrysoptera* Vollenhoven, 1868, ♂ ♀; *O. flavicornis* Guerin, 1831, ♂ ♀; *O. ostracopterum* Montrouzier, 1855, ♂ ♀; *O. vicinus* Horvath, 1900a, ♂ ♀.

DISTRIBUTION. Australia (Qld, as far south as Babinda), Bismarek Archipelago (New Britain, New Ireland), Java, Borneo, Sumatra, Solomon Islands, Lesser Sunda Islands (Timor Island), Moluccas (Aru, Buru, Halmahera, Morotai, Ternate, Waigeo Islands), New Guinea (Woodlark Island), Sulawesi. One record from New Caledonia requires confirmation.

BIOLOGY. Foodplants: *O. flavicornis* on *Dracontomelon mangiferum* Blume (Sapindales: Anacardiaceae) (Mr G.F. Gross, SAM, pers. com.); an *Oncomeris* sp. on young leafy shoots of *Cassia nodosa* Bueh.-Ham. ex Roxb. and *C. javanica* L. (Fabales: Leguminosae) (label data).

#### **Peltocopta** Bergroth, 1904

TYPE SPECIES. *Peltocopta crassiventris* (Bergroth, 1895).

DIAGNOSIS. Body distinctly flattened in cross section; anterolateral pronotal and abdominal lateral margins foliaceous (Fig. 1C); jugae elongate, horn-like (see Leston, 1955a: fig. 2); mesosternum: with anterior medial transverse carina; abdominal segment 7 encircling genital segments; male parameres absent (possibly functionally replaced by distinctive pygophoral hypandrial processes – see Leston, 1955a: fig. 5 and Kumar, 1969: fig. 41); paratergite 9 of female

projecting ventral to paratergite 8 when viewed dorsally.

DESCRIPTION. Body length 20.5-26.5mm; dorsal view (Fig. 1C) (see also Leston, 1955a: fig. 1).

*Head.* Longer than wide; antennae 5-segmented, apex reaching hemelytral membrane; jugae contiguous medially or separated anterior to tylus; rostral apex reaching mesosternum.

*Thorax.* Posterior pronotal margin terminating at scutellar base; scutellum usually wider than long (occasionally as wide as long), apex reaching abdominal tergum 4; hamus of hind wing absent; mesosternum lacking anterior medial earina or tubercle, xyphus flat, with obsolete thin longitudinal carina; metasternum tumid, with narrow medial longitudinal earina (see Leston, 1955b: fig. 3), posterior margin not produced over second abdominal sternum.

*Abdomen.* Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2 medially simple; sternum 3 medially with broad, weakly elevated tubercle pressing anteriorly into posterior margin of sternum 2.

*Legs.* Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

*Female Genitalia.* Sclerotised rami absent; spermathecal bulb non-spherical in profile, spermathecal duct below proximal flange usually slender, with lateral duct leading to a sae-like expansion (see Kumar, 1969: fig. 85).

*Male Genitalia.* Pygophore, external opening posterior in position; aedeagus, vesica forming a sclerotised tube of variable profile; conjunctiva with: one pair of short, mostly lightly sclerotised laterodistal processes; one pair of long, sclerotised ventrolateral distal processes (Fig. 7F) (see also Kumar, 1969: fig. 40).

INCLUDED SPECIES. *Peltocopta crassiventris* Bergroth, 1895, ♂ ♀.

DISTRIBUTION. Australia (S Qld, N NSW).

BIOLOGY. Foodplants: *P. crassiventris* on *Mallotus discolor* F. Muell. ex Benth. (Euphorbiales: Euphorbiaceae) (Kumar, 1969).

REMARKS. Specimens of this genus are known from a very limited number of sites. The specimens found in many institute collections originate from a foodplant growing in the grounds of the Chevron Hotel, Surfers Paradise,

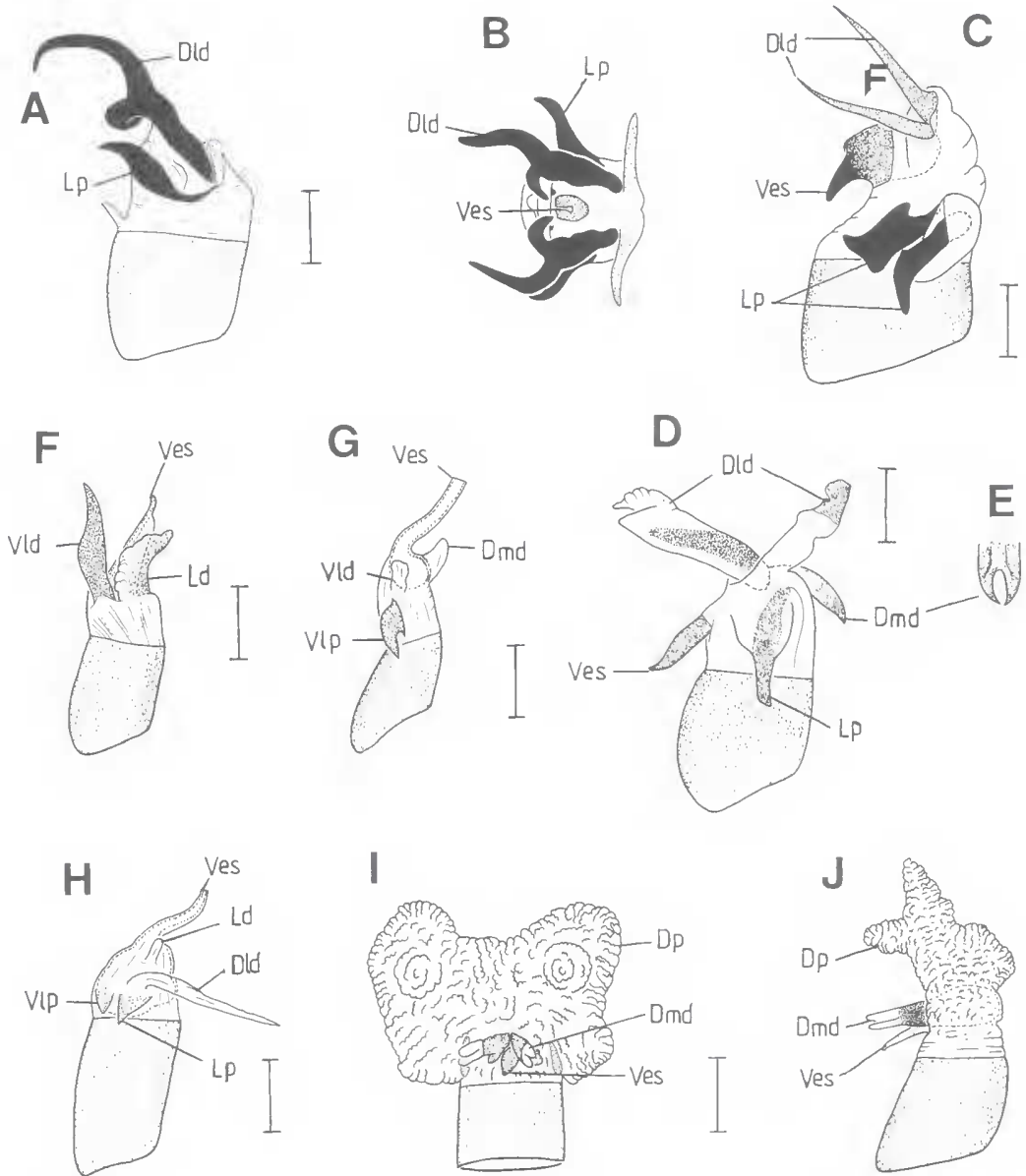


FIG. 7. A-J, aedeagus, lateral view, right side except apical view for B, dorsal view of dorsomedial distal conjunctival process for E, ventral view for I; A,B, *Lyramorpha edulis* Blöte; C, *L. parens* Breddin; D,E, *L. brongersmai* Blöte; F, *Peltocopta crassiventris*; G, *Erga longitudinalis*; H, *Garceus fidelis*; I,J, *Musgraveia sulciventris* (after Kumar, 1969). Abbreviations: conjunctival processes: Dld, dorsolateral distal; Dmd, dorsomedial distal; Dp, dorsoproximal; Ld, laterodistal; Lp, lateroproximal; Vld, ventrolateral distal; Vlp, ventrolateral proximal. Ves, vesica. Scale bars: A,B = 1.00mm, C-G = 0.78mm, H = 0.39mm, I,J = 0.95mm.

southern Queensland about 1964, prior to the site being levelled for construction of a new hotel.

**Piezosternum** Amyot & Serville, 1843

TYPE SPECIES. *Piezosternum subulatum* (Thunberg, 1783).

**DIAGNOSIS.** Jugae of head short (Fig. 4C); metasternum with elevated broad carina, latter produced anteriorly as a compressed raised wedge and adpressed to mesosternum (Fig. 6G); spermathecal duct below proximal flange initially slender then usually dilated to base of duct (duct slender basally in *P. calidum*) (see Kumar, 1969: fig. 92).

**DESCRIPTION.** Body length 16-24mm; dorsal view (Fig. 4A).

**Head.** Wider than long; antennae 5-segmented, apex reaching scutellum; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

**Thorax.** Posterior pronotal margin produced over scutellar base; scutellum longer than wide, apex reaching abdominal tergum 5; hamus of hind wing absent; mesosternum with anterior medial tubercle, xyphus flat; metasternum: posterior margin produced over second abdominal sternum, touching tubercle of third abdominal sternum, remainder as in diagnosis.

**Abdomen.** Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2 medially simple; sternum 3 with weakly produced, broadly conical, anterior medial tubercle.

**Legs.** Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

**Female Genitalia.** Sclerotised rami present; spermathecal bulb usually spherical in profile (non-spherical in *P. calidum*, *P. fallax*), spermathecal duct as in diagnosis.

**Male Genitalia.** Pygophore, external opening dorsal in position. aedeagus, vesica forming a mostly membranous tube; conjunctiva with: one pair of usually lightly sclerotised dorsolateral distal processes (inner-most lobe membranous in *P. depressum*, *P. subulatum* [Fig. 8J] and *P. thunbergi*); one pair of sclerotised lateroproximal processes; usually lacking one pair of membranous ventrolateral distal processes [present in *P. calidum* (Fig. 9A) (see also Kumar, 1969: fig. 70); usually lacking one elongate, sclerotised ventromedial distal process (present in *P. fallax* [Fig. 9B] [see also Kumar, 1969: fig. 74] and *P. rubens*).

**INCLUDED SPECIES.** Subgenus *Piezosternum*: *P. subulatum* (Thunberg, 1783), \*♀, ♂♀; *P. thunbergi* Stål, 1860, \*♂♀, ♂♀; Subgenus *Piezosternias*: *P. calidum* (Fabricius, 1787), ♂♀; *P. calidum breddini* Schouteden, 1905; *P. fallax* Breddin, 1898, ♂♀; *P. rubens* Distant, 1879, ♂♀; *P. venezolanum* Piran, 1971. Undescribed specimens with label bearing the following names: *P. depressum* Van Duzee, ♂; *P. geminatum* Van Duzee, ♀.

**DISTRIBUTION.** *Central and South America*: Argentina, Bolivia, Brazil, Cape Verde Islands, Colombia, Cuba, Ecuador, French Guiana, Guyana, Hispaniola, Lesser Antilles (Guadeloupe, Martinique Islands), Mexico, Panama, Paraguay, Puerto Rico, Surinam, Uruguay, Venezuela, West Indies. *Africa*: Angola, Cameroon, Central African Republic, Congo, Gabon, Ghana, Equatorial Guinea, Guinea, Ivory Coast, Kenya, Madagascar, Malawi, Nigeria, Ruanda, Sierra Leone, Somalia, Sudan, Tanzania, Togo, Zaire, Zanzibar, Zimbabwe. *Southern India*.

**BIOLOGY.** Biology of *P. calidum* is discussed by Goodchild (1967) and Goodchild & Lubega (1968). In this species the midgut gastric caecal bacteria are thought to assist in nutrition of the insect (Goodchild, 1978). Foodplants: *P. calidum*: feed on leaves (first, second instars) and stems (third instar to adult) of *Telfairia pedata* (Sm.) Hook. (Violales: Cucurbitaceae) (Goodchild, 1967; Goodchild & Lubega, 1968); on *Momordica cissoides* Planch. ex Benth. and *M. foetida* Schum. (Violales: Cucurbitaceae) (Leston, 1955b); on stem, especially fruit, of *Sterculia cinerea* A. Rich. (Malvales: Sterculiaceae) (Mayne & Ghesquiere, 1934); on stem, especially fruit, of *Theobroma cacao* L. (Malvales: Sterculiaceae) (Mayne & Ghesquiere, 1934). *P. fallax* on: stem, especially fruit, of *Sterculia cineria* (Malvales: Sterculiaceae) (Mayne & Ghesquiere, 1934); stem, especially fruit, of *Theobroma cacao* (Malvales: Sterculiaceae) (Mayne & Ghesquiere, 1934).

**REMARKS.** In most species of this genus the anterolateral pronotal margins are not produced. However, they are produced as an acute spine in *P. subulatum*.

**Plisthenes** Stål, 1864

TYPE SPECIES. *Plisthenes merianae* (Fabricius, 1775).

**DIAGNOSIS.** Hind tibiae dilated subbasally on inner margins (Fig. 4F); posterior margin of male pygophore produced as a pair of narrow bifurcations (Fig. 6C); lateral jugal margins,



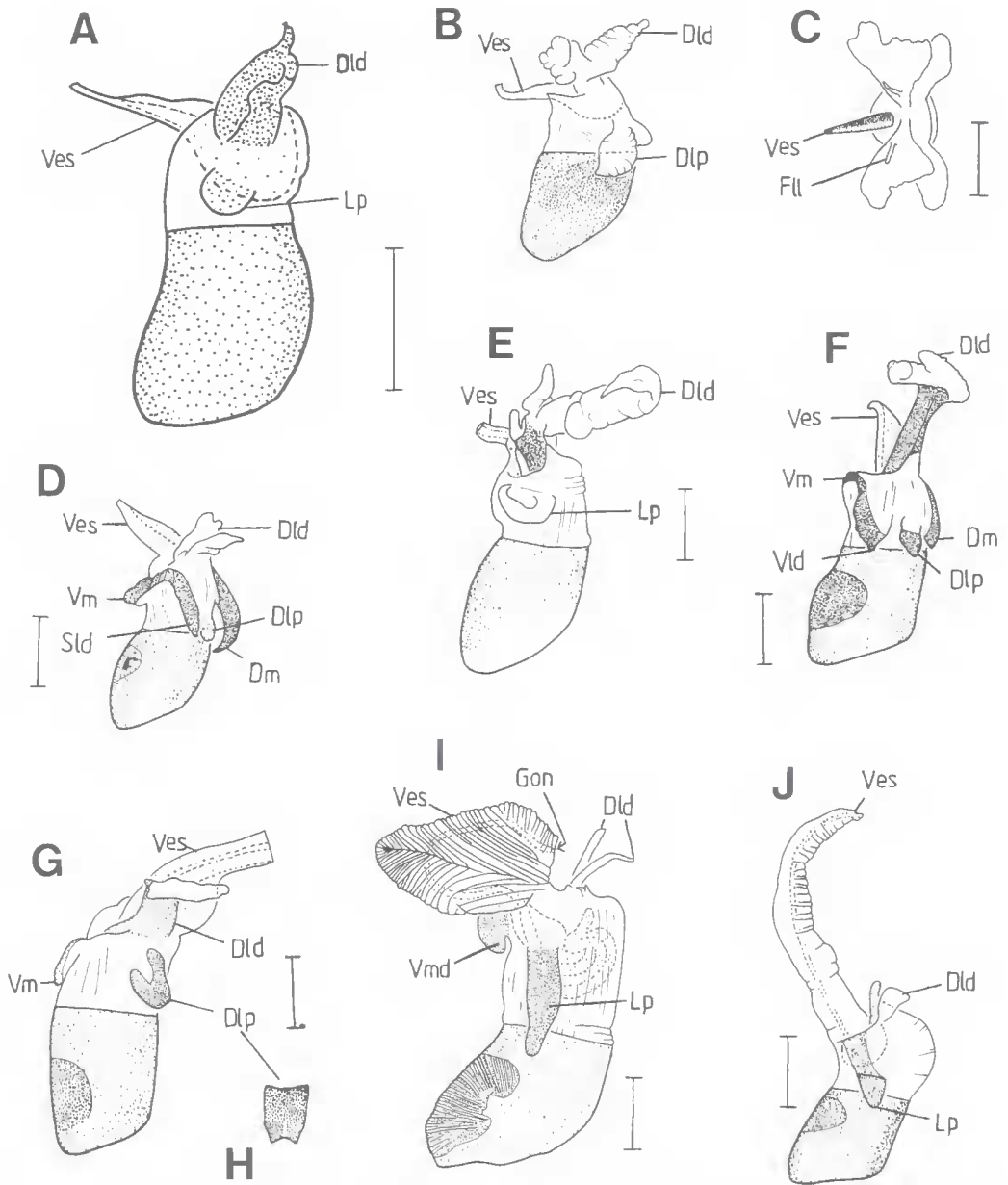


FIG. 8. A-J, aedeagus, lateral view, right side except apical view for C, ventral view of ventromedial conjugal process for H; A, *Musgraveia antennatus* (Distant); B,C, *Stilida sinuata* Stål; D, *Tamolia* sp.; E, *Rhoecus australasiae*; F, *Plisthenes merianae*; G,H, *Oncomeris flavicornis*; I, *Neosalica forbesi* (after Kumar, 1969); J, *Piezosternum subulatum*. Abbreviations: conjugal processes: Dld, dorsolateral distal; Dlp, dorsolateral proximal; Dm, dorsomedial; Lp, lateroproximal; Sld, sublaterodistal; Vm, ventromedial; Vmd, ventromedial distal. Fii, finger-like lobe of dorsolateral distal process; Gon, gonopore. Ves, vesica. Scale bars: A,B = 0.78mm, C = 0.80mm, D = 0.78mm, E = 1.34mm, F = 1.17mm, G,H = 1.05mm, I = 0.78mm, J = 1.18mm.

inner margin of eyes, ring surrounding ocelli, pronotal anterolateral submargins and anterior margin, reticulate fore wing veins and transverse vittae medially on abdominal lateroterga usually yellow brown, ground colour of body dark brown-black.

**DESCRIPTION.** Body length 22-39.5mm; dorsal view (Fig. 3C).

**Head.** Wider than long; antennae 4-segmented, apex reaching scutellum; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

**Thorax.** Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex reaching abdominal tergum 5; hamus of hind wing absent; mesosternum lacking an anterior medial carina or tubercle; xyphus broadly swollen; metasternum convex, concave posteriorly to receive dorsal subbasal surface of adpressed third abdominal sternal spine, posterior margin not produced over second abdominal sternum.

**Abdomen.** Intersegmental suture of abdominal sterna 2-3 terminating dorsolaterally; sternum 2 medially simple; sternum 3 medially with apex of spine reaching mesosternum.

**Legs.** Fore femora on subapical, anterior margin of inferior surface armed with a prominent spine; hind femora of male incrassate when compared to mid and hind femora, subapical inferior surface bearing a tubercle (Fig. 4F).

**Female Genitalia.** Sclerotised rami absent; spermathecal bulb non-spherical in profile, spermathecal duct below proximal flange usually slender, with lateral duct leading to a sac-like expansion (see Kumar, 1969: fig. 88).

**Male.** Pygophore, external opening posterior in position; aedeagus, vesica forming a mostly sclerotised tube of variable profile; conjunctiva with: one pair of sclerotised dorsomedial processes; one pair of sclerotised dorsolateral proximal processes; one pair of elongate, sclerotised, apically membranous, dorsolateral distal processes; one pair of sclerotised, ventrolateral distal processes, latter joined by variably sclerotised strip to one pair of variably sclerotised ventromedial processes (Fig. 8F) (see also Kumar, 1969: fig. 50).

**INCLUDED SPECIES.** *P. australis* Horvath, 1900a, ♂ ♀; *P. buruensis* Breddin, 1904; *P. confusus* Horvath, 1900a, ♂ ♀; *P. dilatatum* (Montrouzier, 1855), \* ♂ ♀, ♂ ♀; *P. merianae* (Fabricius, 1775), \* ♂, ♂ ♀; *P. moluccanus* Horvath, 1900a, \* ♂; *P. scutellatus* Distant, 1889, ♂ ♀.

**DISTRIBUTION.** Australia (Qld, as far south as Byfield State Forest, 40km N of Yeppoon), New Guinea (D'Entrecasteaux, Goodenough and Woodlark Islands), Bismarck Archipelago (New Britain, New Ireland), Solomon Islands (Bougainville; Guadalcanal, Haruku and Obi Islands); Tokelau (Atafu Island), Borneo, Java, Sulawesi, Moluccas (Amboina, Aru, Bachan, Buru, Ceram, Halmahera, Misool, Morotai, Salawati and Waigeo Islands), Sumatra, Lesser Sunda Islands (Timor Island), Malay Peninsula (West Malaysia).

**BIOLOGY.** Foodplants: a *Plisthenes* sp. on *Citrus* sp. (Sapindales: Rutaceae) (M. DeBaar, Queensland Forest Service, pers. comm.).

### **Rhoecus** Bergroth, 1891

**TYPE SPECIES.** *Rhoecus australasiae* (Westwood, 1837b).

**DIAGNOSIS.** Hind tibiae bearing two 'teeth' on inner margins (Fig. 5A).

**DESCRIPTION.** Body length: 26-32.5mm; dorsal view (Fig. 3A).

**Head.** Wider than long; antennae 5-segmented, apex reaching hemelytral membrane; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

**Thorax.** Posterior pronotal margin terminating at scutellar base; scutellum wider than long to as wide as long, apex reaching abdominal tergum 4; hamus of hind wing absent; mesosternum with anterior medial carina, xyphus carinate; metasternum tumid, with weakly developed medial longitudinal carina on anterior half, posterior margin not produced over second abdominal sternum.

**Abdomen.** Intersegmental suture of abdominal sterna 2-3 terminating dorsolaterally; sternum 2 medially weakly tumid; sternum 3 with anterior medial subspinose tubercle.

**Legs.** Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male incrassate when compared to mid and hind femora, subapical inferior surface bearing a tubercle (Fig. 5A).

**Female Genitalia.** Sclerotised rami present; spermathecal bulb non-spherical in profile, spermathecal duct below proximal flange usually slender, with lateral duct leading to a sac-like expansion (see Kumar, 1969: fig. 89).

**Male Genitalia.** Pygophore, external opening posterior in position; aedeagus, vesica forming a

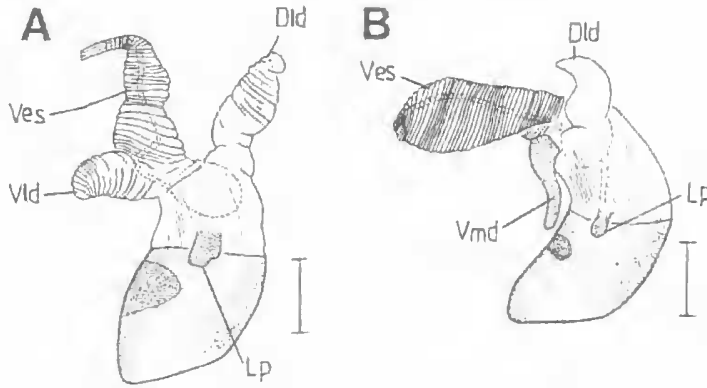


FIG. 9. A,B, aedeagus, lateral view, right side: A, *Piezosternum calidum* (Fabricius); B, *P. fallax* Breddin. Abbreviations: conjunctival processes: Dld, dorsolateral distal; Lp, lateroproximal; Vld, ventrolateral distal; Vmd, ventromedial distal. Ves, vesica. Scale bars: A, B = 0.78mm.

sclerotised tube of variable profile; conjunctiva with: one pair of mostly membranous dorsolateral distal processes (each process trilobate); one pair of smaller, membranous lateroproximal processes (each process bilobate) (Fig. 8E) (see also Kumar, 1969, fig. 56).

**INCLUDED SPECIES.** *Rhoecus australasiae* (Westwood, 1837b). \*♂, ♀♂.

**DISTRIBUTION.** Australia (Queensland, New South Wales). A record from Victoria requires confirmation.

**BIOLOGY.** Foodplants: *R. australasiae* on *Melicope micrococca* (F. Muell.) T.G. Hartley (syn. *Euodia micrococca* F. Muell.) (Sapindales: Rutaceae) (G.B. Monteith, pers. comm.).

**REMARKS.** This genus is more commonly known as *Rhoecocoris* Bergroth (1895). Bergroth chose that name over the preexisting *Rhoecus* Bergroth (1891) because he considered *Rhoecus* Bergroth (1891) to be preoccupied by *Roicus* Clark, 1860. However, Rolston et al. (1993: 55) point out that those names 'are similar but not identical and therefore not homonyms'. As *Rhoecus* Bergroth (1891) validly pre-dates *Rhoecocoris* Bergroth (1895) its name has priority.

**Stilida Stål, 1863**

**TYPE SPECIES.** *Stilida indecora* Stål, 1863.

**DIAGNOSIS.** Spermathecal duct of female genitalia entering and leaving spermathecal diverticulum at separate points (see Kumar,

1969: fig. 79); inner surface of male aedeagal dorsolateral distal conjunctival processes bearing one short, finger-like, stout lobe subbasally (Fig. 8C).

**DESCRIPTION.** Body length 20-28mm; dorsal view (Fig. 2B).

**Head.** Wider than long; antennae 4-segmented, apex reaching scutellum; jugae contiguous medially, or separated, anterior to tylus; rostral apex reaching mesosternum.

**Thorax.** Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex

reaching abdominal tergum 5; hamus of hind wing absent; mesosternum with weakly developed anterior medial tubercle, xyphus bicarinate, weakly sulcate medially; metasternum swollen, ventral surface mostly flat, posterior margin not produced over second abdominal sternum.

**Abdomen.** Intersegmental suture of abdominal sterna 2-3 terminating dorsoanteriorly; sternum 2 simple medially; sternum 3 with obsolescent anterior medial tubercle.

**Legs.** Fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

**Female Genitalia.** Sclerotised rami present; spermathecal bulb non-spherical in profile, spermathecal duct below proximal flange usually slender, with lateral duct leading to a sac-like expansion (see Kumar, 1969: fig. 79).

**Male Genitalia.** Pygophore, external opening posterior in position; aedeagus, vesica forming a sclerotised tube of variable profile; conjunctiva with: one pair of lightly sclerotised dorsolateral proximal processes; one pair of lightly sclerotised dorsolateral distal processes, each process with diagnostic character state above (Fig. 8B,C) (see also Kumar, 1969: fig. 21).

**INCLUDED SPECIES.** *S. indecora* Stål, 1863 ♂♀; *S. sinuata* Stål, 1870 \*♂, ♂♀.

**DISTRIBUTION.** Australia (Qld; NSW, as far south as Dalmorton).

**BIOLOGY.** The biology of *S. indecora* Stål is briefly discussed in Kumar (1969). Foodplants:

*S. indecora* on *Arytera* sp. and *Cupaniopsis parvifolia* (F.M.Bailey) L.A.S. Johnston (Sapindales: Sapindaceae) (G.B. Monteith, pers. comm.).

REMARKS. This genus may be confused with the genus *Musgraveia* (Fig. 2C).

#### **Tamolía** Horvath, 1900a

TYPE SPECIES. *Tamolía ramifera* (Walker, 1868).

DIAGNOSIS. Male aedeagal vesica with one pair of sclerotised sublateral processes (joined by sclerotised strip to ventromedial processes) (Fig. 8D).

DESCRIPTION. Body length 18-24.5mm; dorsal view (Fig. 2D).

*Head.* Wider than long; antennae 4-segmented, apex reaching scutellum; jugae contiguous medially anterior to tylus; rostral apex reaching mesosternum.

*Thorax.* Posterior pronotal margin terminating at scutellar base; scutellum longer than wide, apex reaching abdominal tergum 5; hamus of hind wing absent; mesosternum lacking an anterior medial carina or tubercle, xyphus broadly swollen; metasternum convex, concave posteriorly to receive dorsal subbasal surface of adpressed third abdominal sternal spine, posterior margin not produced over second abdominal sternum.

*Abdomen.* Intersegmental suture of abdominal sterna 2-3 terminating dorsolaterally; sternum 2 simple medially; sternum 3 medially with apex of spine reaching to mesosternum.

*Legs.* fore femora on subapical, anterior margin of inferior surface unarmed; hind femora of male slender when compared to mid and hind femora, subapical inferior surface unarmed.

*Female Genitalia.* Sclerotised rami present; spermathecal bulb non-spherical in profile, spermathecal duct below proximal flange usually slender, with lateral duct leading to a sac-like expansion (Fig. 5F).

*Male Genitalia.* Pygophore, external opening posterior in position; aedeagus, vesica forming a mostly sclerotised tube of variable profile; conjunctiva with: one pair of sclerotised dorsomedial processes; one pair of lightly sclerotised dorsolateral proximal processes; one pair of membranous dorsolateral distal processes; remainder as in diagnosis (Fig. 8D).

INCLUDED SPECIES. *Tamolía ramifera* (Walker, 1868), \*♀; *Tamolía* undescribed species, ♂♀.

DISTRIBUTION. New Guinea.

BIOLOGY. Food plants and other biological information unknown.

REMARKS. This genus may be confused with *Plisthenes* (Fig. 3C). Only three specimens of this genus are known to the author in collections worldwide.

#### **Tibiospina** Sinclair 2000

TYPE SPECIES. *Tibiospina darlingtoni* Sinclair 2000.

DIAGNOSIS. See Sinclair (2000).

DESCRIPTION. See Sinclair (2000).

INCLUDED SPECIES. *Tibiospina darlingtoni* Sinclair, 2000.

DISTRIBUTION. Australia (Wet Tropics area, N Qld).

BIOLOGY. Foodplants and other biological information unknown.

REMARKS. Existing specimens of this genus were collected in higher altitude rainforest.

#### ACKNOWLEDGEMENTS

For constructive critical comments, encouragement or support during the research and writing of this paper I thank Professor R. Kumar, The University of Papua New Guinea; retired Associate Professor F.J.D. McDonald, The University of Sydney, NSW; my partner F. McMeekin; Dr G.B. Monteith, Queensland Museum, Qld; Dr Andrew Rozefelds, Tasmanian Herbarium, Tasmania, and my parents, J.P. and J.M. Sinclair. J. Clarkson, Dept of Primary Industries Mareeba, Qld, B. Gray and A. Ford, CSIRO Atherton, Qld, provided correct names and authors for the foodplant records.

Most of the research for this paper was undertaken while the author was a PhD student. Financial assistance for PhD studies was made possible by an Australian Commonwealth Postgraduate Award and a URG grant from the University of Sydney.

I am grateful to the following institutions and their indicated staff for loan of study material. Australian Museum, Sydney, Australia (D. McAlpine); American Museum of Natural History, New York, U.S.A. (R.T. Schuh); Australian National

- Insect Collection, CSIRO, Canberra, Australia (M. Carver); Agriculture New South Wales, Orange, Australia (M.J. Fletcher); Museum of Natural History, London, England (W.R. Dolling); Bernice Pauahi Bishop Museum, Hawaii, U.S.A. (G.M. Nishida); California Academy of Sciences, San Francisco, U.S.A. (N.D. Penny); Central Reference Insect Collection, DPI, Port Moresby, P.N.G. (J. Ismay); National Arthropod Collection, Landcare, Auckland, New Zealand (C. Butcher); Hope Entomological Collections, Oxford, England (I. Lansbury and M.J. Scoble); Institut für Pflanzenschutzforschung der Akademie der Landwirtschaftswissenschaften der DDR, Eberswalde, East Germany (J. Deckert); Institute of Zoology, Academia Sinica, Beijing, Peoples Republic of China (L. Hong-Shing); Koninklijk Belgisch Instituut Voor Natuurwetenschappen, Brussels, Belgium (P. Dessart and J. van Stalle); Koninklijk Museum Voor Midden-Africa, Tervuren, Belgium (H.M. Andre and G. Schmitz); L.H. Rolston private collection, Louisiana, U.S.A. (L.H. Rolston); Macleay Museum, Sydney, Australia (D. Horning); Museum National D'Histoire Naturelle, Paris, France (D. Plout-Sigwalt); Museum Zoologicum Bogoriense, Bogor, Indonesia (S. Adisoemarto); Museo Zoologico de 'La Specola', Florence, Italy (S. Mascherini); Natural History Museum of Los Angeles County, Los Angeles, U.S.A. (C.L. Hogue); National Museum of Natural History, Smithsonian Institution, Washington, U.S.A. (D.A. Polhemus); Naturhistorisches Museum, Vienna, Austria (A. Kaltenbach); National Museum of Victoria, Melbourne, Australia (A. Neboiss); Naturhistoriska Riksmuseet, Stockholm, Sweden (P. Lindskog); Polska Akademia Nauk, Instytut Zoologii, Warszawa, Poland (A. Kedziorek and G. Winiszewska-Slipinska); P. Stys private collection, Praha, Hungary (P. Stys); Queensland Department of Forestry Collection, Brisbane, Australia (M. DeBaar); Queensland Department of Primary Industries Insect Collection, Brisbane, Australia (I.D. Galloway); Queensland Museum, Brisbane, Australia (G.B. Monteith); Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands (P.H. van Doesburg); South Australian Museum, Adelaide, Australia (G.F. Gross); Staatliches Museum für Tierkunde, Dresden, East Germany (R. Emmrich); Tasmanian Department of Agriculture Insect Collection, Hobart, Tasmania, Australia (A. Terrauds); Transvaal Museum, Pretoria, South Africa (R.B. Toms); Termesztudományi Múzeum Allattara, Budapest, Hungary (T. Vasarhelyi); University Museum of Zoology, Cambridge, England (W.A. Foster); University of Queensland Insect Collection, Brisbane, Australia (M. Schneider); University of Uppsala Insect Collection, Uppsala, Sweden (S. Jonsson); Universitets Zoologiske Museum, Copenhagen, Denmark (S. Langemark); Western Australian Museum, Perth, Australia (T. Houston); Zoological Institute, Leningrad, U.S.S.R. (I.H. Kerzhner); Zoologisches Museum, Museum für Naturkunde der Humboldt-Universität zu Berlin, East Germany (U. Gollner-Scheidung); Zoological Museum, University of Helsinki, Helsinki, Finland (A. Jansson); Zoologisches Institut und Zoologisches Museum, Universität Hamburg, West Germany (H. Strümpel).
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